

rower; its groove is narrow and inconspicuous. The hinge-margin itself is rather thin and bears very numerous, erect, V-shaped, acute teeth which number, in the large specimens, about sixteen or seventeen in the anterior series and about thirty-two or thirty-three in the posterior, including a number of small proximal ones; beneath the beaks there is a smooth, edentulous space, often a little thickened at the inner margin and projecting a little inward in the middle, and continuing inside the series of small proximal teeth on each side. In some cases this thickened border seems to arise anteriorly and to pass under the posterior series, as a slight fold; in other cases it is continued directly from one series to the other. The posterior series is nearly straight and about twice as long as the anterior which is strongly curved and distally somewhat recedes from the thin dorsal margin. The anterior end of the shell is rather short and evenly rounded; the posterior is about twice as long, a little wider owing to a slight ventral expansion, compressed and obtusely rounded or subtruncated at the margin, but without any distinct carination or angulation. The pallial sinus is very broad and deep, extending nearly to the middle of the shell. The inner surface is smooth, white or grayish white. The exterior is smooth, except for the delicate lines of growth, and covered with a thin, brilliantly iridescent epidermis which, in live specimens, is pale yellowish green, but in dead valves is pale straw color.

Our larger specimens measure about 15 or 16 mm. in length and 9 or 9.5 mm. in height.

Found at many stations between N. lat. $41^{\circ} 28'$, W. long. $65^{\circ} 35'$, and N. lat. $35^{\circ} 16'$, W. long. $75^{\circ} 2' 30''$, in 516 to 1,781 fathoms, 1883-1887.

MALLETIA ABYSSORUM, new species.

(Plate XCVII, fig. 7.)

Shell small, not much compressed, lustrous, iridescent, subovate, not gaping, decidedly inequilateral, with the posterior end the longer, broader, obtusely rounded, without any distinct rostration. Umbos rather prominent, rising above the outline of the dorsal margin, with small beaks turned backward at the tip. Lunule and escutcheon abortive. The short antero-dorsal margin is slightly concave, and slopes rapidly to the slightly angulated anterior end; the ventral margin is very broadly and evenly convex, the curvature receding somewhat posteriorly, so that the greatest height of the shell is somewhat back of the middle, posteriorly there is a slight extension of the edge corresponding to an indistinct radial ridge; the posterior end is very broad, obtuse, not angulated, with the dorsal margin nearly horizontal, slightly convex, compressed and forming a slight angle where it joins the posterior curve. A very slight groove defines a very faint escutcheon, along the edge of which the teeth can be seen through the substance of the shell. The surface is polished, brilliantly iridescent, and is marked by faint, raised, concentric lines, or ridges parallel with the lines of growth;

near the ventral margin these become more elevated, clearly defined, and are separated by wider, slightly concave grooves. The hinge-plate is rather thin and delicate, regularly curved, without any angle at the beaks, with the posterior portion considerably the longer. There is a small, median, specialized ligament which occupies a lunate, or nearly semicircular notch in the hinge-plate directly beneath the beak, which does not extend through its entire width although it is here quite narrow. The posterior ligament is pretty well developed and extends from the beak, where it is closely connected with the median portion, nearly to the distal end of the series of teeth, and occupies a distinct marginal groove; the portion nearest the beaks, opposite the smaller teeth, is thicker and darker colored than the rest and projects slightly, in a dorsal view; a delicate, inconspicuous portion continues a little in front of the beak, in a thin groove. The median portion of the ligament is so closely connected with the posterior portion that it appears to be a specialized, thickened portion of it, but is evidently homologous with the resilium of other genera; it is situated, however, outside the series of teeth and must serve as a ligament. The larger teeth are delicate, subacute, V-shape, compressed in a direction parallel with the dorsal margin, with deep pits between them. There are about ten in the anterior series, including three or four, very small, scarcely raised ones next the beak; and fourteen in the posterior series, of which the seven distal ones are decidedly larger than the rest, the tenth to the thirteenth being the largest; about four, next the proximal end of the series, are like small, rounded tubercles or granules without a V-shape form; following these are three of intermediate form, increasing in size distally, the seventh being more or less V-shaped; these smaller teeth form a series along the inner edge of the hinge-plate. An edentulous ridge, about as long as the space occupied by the first three teeth, extends from the first tooth to the ligament-pit and is continuous with a similar, thinner ridge running below the ligament-pit to the anterior series of teeth. The pallial sinus is of moderate size and triangular in form.

Length, 5 mm.; height, 4 mm.

One live specimen (No. 52159), station 2566, off Chesapeake Bay, in 2,620 fathoms, 1885.

MALLETIA POLITA, new species.

(Plate LXXXII, fig. 10.)

Shell of moderate size, irregularly ovate, somewhat swollen, the ventral region convex and the posterior end somewhat produced with a short rostrum. Epidermis light yellow, lustrous and iridescent. Umbos not prominent, beaks small, strongly incurved, only slightly elevated above the margin. The antero-dorsal margin is slightly convex and slopes gently to the short, obtusely rounded anterior end which is slightly angulated in the middle; the ventral margin is strongly con-

vex, a little produced in the middle, and with a slight incurvature toward the posterior end, below the rostrum; the posterior end is narrowed and produced into a short obtuse rostrum with a nearly straight dorsal margin. The surface is covered with rather fine, somewhat uneven, concentric lines and undulations. The hinge-margin is but little thickened; the anterior portion is the shorter and the more curved and forms a very obtuse angle with the posterior portion which is nearly straight. There are about twelve conspicuous, rather elevated, sharp teeth in the anterior series besides three or four minute, proximal ones; and more than twenty in the posterior series, the number being indeterminable owing to an injury to the margin close to the beak. The external ligament is large and conspicuous and occupies a marginal groove extending the entire length of the posterior series of teeth. There appears to have been no chondrophore, but whether the line of teeth was continuous is uncertain.

Length, 14.5 mm.; height, 9 mm.

One valve (No. 78972), station 2718, N. lat. $38^{\circ} 24'$, W. long. $71^{\circ} 52'$, in 1,569 fathoms, 1886.

NEILO Adams, 1858.

Neilo H. and A. ADAMS, Genera of Recent Mollusca, II, p. 549; III, pl. cxxvi, figs. 7, 7a, 7b, 1858.—VERRILL and BUSH, Amer. Journ. Sci., III, pp. 57, 63, January, 1897.

Type.—*Neilo cumingii* Adams.

The type species of this genus has an oblong shell, with a straight postero-dorsal margin and a well-defined rostrum, bounded beneath by a pronounced furrow and a marginal indentation, while more ventrally, the margin protrudes somewhat, the pouting of the margin corresponding with special lobes of the margin of the mantle. *N. cumingii* from New Zealand is concentrically grooved, but *N. goniura* (Dall)¹ from off the coast of Ecuador is smooth or nearly so.

NEILONELLA Dall, 1881.

Saturnia SEGUENZA, Nuculidi terziarie merid. d' Ital., R. Accad. Lincei, I, p. 1178, 1877 (not Schrank, 1802).

Leda (section *Neilonella*) DALL, Bull. Mus. Comp. Zoöl., IX, p. 125, 1881; XII, p. 254, 1886. + *Saturnia* Dall, p. 263.

Neilonella VERRILL and BUSH, Amer. Journ. Sci., III, pp. 57, 63, January, 1897.

Type.—*Neilonella corpulenta* Dall.

Shell small, swollen, short-ovate, with both ends obtuse; the posterior somewhat the longer, blunt at tip, without any distinct rostrum or carina. Exterior usually concentrically grooved. Ligamental area not defined. Beaks usually prominent and turned inward and slightly backward. Ligament well developed, extending under and before the beaks in a distinct groove, more prominent behind. Resilium very

¹ Dall, Proc. U. S. Nat. Mus., XII, p. 251, pl. x, fig. 10, 1889.

minute or nearly abortive, occupying a slight notch in the dorsal margin under the beak, external to the series of teeth, which are interrupted only by a small, thin edentulous space. Pallial sinus small. Siphon tubes short. Labial palpi large, broad, crescent-shaped, with long tentacular appendages. Gills small, triquetral.

We consider this group worthy of generic rank. It appears to be more nearly allied to *Malletia* than to *Yoldia* or *Leda*. We can find no generic characters to distinguish Dall's typical species (*N. corpulenta*) from *N. pusio*, which was the type of the section, *Saturnia*, proposed by Seguenza. They agree closely in form, external sculpture, arrangement of the teeth, and structure of ligament and resilium. The name, *Saturnia*, being preoccupied by Schrank, 1802, we have adopted Dall's name for both of his sections.

The following species appear to belong here:

N. corpulenta Dall (type), and *N. quadrangularis* (Dall), West Indies; *N. sericea* (Jeffreys), Ireland and Portugal; *N. pusio* (Philippi), Mediterranean and West Indies; *N. subovata* Verrill and Bush, from off Cape Hatteras, North Carolina, northward.

NEILONELLA SUBOVATA Verrill and Bush.

(Plates LXXX, fig. 10; LXXXII, figs. 3, 4.)

Yoldia sericea JEFFREYS, var. *striolata* VERRILL, Trans. Conn. Acad., VI, p. 226, 1884.—VERRILL, Expl. Albatross, Report U. S. Com. Fish and Fisheries for 1883, p. 576, 1885.

Neilonella subovata VERRILL and BUSH, Amer. Journ. Sci., III, p. 57, figs. 7, 8, 22, January, 1897.

Shell somewhat swollen, subovate, with the dorsal margin angulated and the umbos somewhat prominent. The antero-dorsal margin is somewhat convex, pinched up at the edge, and sloped gradually to the evenly rounded anterior end; ventral margin is broadly and nearly evenly rounded throughout, without any sinuosity, and forms a blunt point at its junction with the postero-dorsal margin, which is nearly straight or slightly convex for the greater part of its length, with the edge thin and pinched up. The umbos are somewhat prominent and the beaks curve strongly inward and incline a little backward at the tip. The ligament is well developed, dark brown, and as seen in a dorsal view, fills a narrow, lanceolate excavation in the margin just behind the beaks. In an interior view it is conspicuous behind the beaks and occupies a curved notch immediately under them, and extends forward for a short distance in a thin, marginal groove. The resilium is abortive or nearly so; in many cases it appears to be represented by a minute black speck, adherent to the ligament, and occupying a minute indentation in the edge of the hinge-margin directly beneath the beak, external to the series of teeth. The hinge-margin is broad and rather strong, becoming very narrow below the beak but without a distinct notch or chondrophore; the posterior portion is

nearly straight, the less oblique and considerably the longer, and forms a broad angle with the anterior. There are in the largest examples about eleven or twelve teeth in the anterior series, counting four or five very small proximal ones; and in the posterior series, fifteen or sixteen teeth of which the five or six proximal ones are minute. In many specimens the two series are not distinctly separated under the beak, in others there is a very minute, edentulous space in line with the minute ligamental notch. The largest teeth in the middle of each series are very elongated, erect, acute, with the tips turned upward toward the margin. The surface of the shell is covered with very regular, concentric sulcations separated by narrow, evenly rounded ridges of about the same width; in most cases this sculpture is faint or nearly obsolete toward the postero-dorsal margin and on the umbos. In many specimens, a number of faint radiating striae run from the umbos to the antero-ventral margin, similar lines sometimes occur posteriorly. The epidermis is without much luster, of either greenish yellow, light yellow, or straw color, more or less iridescent, especially near the umbos. Along the dorsal margin the outline of the teeth can be imperfectly seen through the substance of the shell. The interior in fresh specimens is lustrous bluish white and in some cases is distinctly tinged with pale flesh-color. The muscular and pallial impressions are usually indistinct but some specimens show a small, but distinct, angular pallial sinus.

The alcoholic specimens when dissected were found to have a short siphon and a large, stout foot with a broad disk having strongly crenulated edges. The labial palpi were long, crescent-shaped and the tentacle-like appendages arising from the outer bases of the external palpi were very long, slender, and coiled in a spiral. The gills were long, narrow, and prismatic, one on each side.

Length of one of the largest specimens, 6.5 mm.; height, 4.6 mm.; thickness, about 3.5 mm.

Young specimens about 2 mm. long are more equilateral than the adults and have the posterior end less produced and more evenly rounded, the umbos decidedly prominent, and the surface covered with fine, regular, concentric grooves, the epidermis showing distinct iridescence.

Found in large numbers, at many stations, between N. lat. $42^{\circ} 47'$, W. long. $61^{\circ} 4'$, and N. lat. $35^{\circ} 9' 50''$, W. long. $74^{\circ} 57' 40''$, in 125½ to 1,731 fathoms, 1883-1887.

This species shows considerable variation in form when a large series of specimens from the same locality are compared. Some are decidedly more elongated and tapered posteriorly than the typical form, others are somewhat shorter and more regularly ovate with the posterior end blunter or more rounded; all agree essentially in sculpture and in the peculiar structure of the hinge and ligament.

This species has some resemblance to *N. sericea* Jeffreys, of which it

was formerly thought to be a variety. It differs, however, in its larger size, more ovate form, the posterior end being more produced and tapered, and in its stronger sculpture. *N. corpulenta* Dall is narrower, more elongated, with more prominent beaks. *N. quadrangularis* (Dall) is shorter and more triangular in form, with the postero-dorsal margin more oblique.

Subfamily TINDARINÆ Verrill and Bush.

Cucullellina FISCHER, Manuel Conch., p. 981, 1887 (in part).

Tindarina VERRILL and BUSH, Amer. Journ. Sci., III, pp. 58, 63, January, 1887.

The genus *Tindaria* differs so widely from *Malletia* and other genera that it seemed necessary to establish a new subfamily for it.

In this group the shell is rather thick, short-ovate or veneriform, with the posterior end the longer, and with the beaks turned forward. The resilium is wanting. The ligament is well developed and prominent. The teeth are numerous, V-shaped, in two series which are frequently continuous proximally. There is neither pallial sinus nor true siphons. The mantle is broadly open ventrally, but there is a separate anal or efferent orifice surrounded by small sense papillæ. The palpi are large, with long, slender appendages. The foot has a large, terminal, crenulated disk.

This group agrees with *Malletina* in having no resilium, but the latter has well developed siphons and a pallial sinus.

TINDARIA Bellardi, 1873.

Tindaria VERRILL and BUSH, Amer. Journ. Sci., III, pp. 58, 63, January, 1897.

Type.—*Tindaria arata* Bellardi.

Several recent writers on these shells have regarded *Tindaria* as a subgenus of *Malletia*. In reality they form two widely diverse genera and have little resemblance except that in both the resilium is wanting. In typical *Tindaria* the shell is swollen, short-ovate or subcor-date, without any rostration, with prominent umbos and with the beaks turned forward. In fact the shell may be described as veneri-form. The surface is usually concentrically grooved. The series of teeth are often continuous medially. There is no pallial sinus.

A specimen of *T. amabilis* Dall¹ from station 2385, among Foraminifera, in 730 fathoms, not very well preserved in alcohol, has the mantle closed for a short distance behind the anal orifice which is large and surrounded by twelve or more, rather large, unequal papillæ, but does not appear to be capable of being protruded in a tubular form, unless a very short one. The mantle is otherwise freely open along the whole ventral margin to the oral area, with its edges nearly plain,

¹ *Malletia* (*Tindaria*) *cytherea* Dall, Bull. Mus. Comp. Zool., XII, p. 254, 1886; XVIII, p. 438, 1889; = *Malletia amabilis* Dall, p. 438; = *Tindaria amabilis* Dall, pl. XL, fig. 8.

showing only very minute papillæ posteriorly. The foot is large and strong, with a broad, strongly crenulated and striated, concave disk, pointed in front. The gills are well developed and somewhat triquetral. The palpal tentacles are rather large, long, tapered, triquetral, strongly grooved, curved in sickle-shape. The palpi are rather broad and short.

The following are some of the known species:

T. arata Bellardi, and *T. solida* Seguenza, fossil, in the Italian tertiary formation; *T. cytherea* Dall = *T. veneriformis* (Smith), *T. amabilis* Dall, *T. virens* Dall, *T. acinula* Dall, *T. cuneata* (Smith) = *T. smithii* Dall, *T. lata* Verrill and Bush, all Florida and West Indian species; and *T. callistiformis* Verrill and Bush, off Chesapeake Bay.

TINDARIA CALLISTIFORMIS Verrill and Bush.

(Plates LXXVIII, fig. 1; LXXX, figs. 6, 7.)

Tindaria callistiformis VERRILL and BUSH, Amer. Journ. Sci., III, p. 59, figs. 10, 20, 21, January, 1897.

Shell small, stout, thick, regularly ovate, sculptured with very regular, fine, concentric grooves, and having a broad, thick hinge-margin with a continuous line of teeth and no chondrophore. Umbos swollen, beaks prominent, strongly curved inward and somewhat forward, with the nuclear shell (prodissoconch) smooth and glossy. The lunular area is somewhat excavated but has no definite boundary. Anterior end considerably shorter than the posterior, both equally and evenly rounded. Antero dorsal margin convex, sloping rather rapidly and forming a continuous curve with the anterior margin which is also continuous with the more broadly convex ventral margin; the posterior end is evenly rounded, with the dorsal margin strongly convex, sloping gradually, without any definite angulation. The surface is covered with very regular, fine, close, concentric, rounded ridges, separated by semicircular furrows about twice their width, except on the umbos where the two are about equal. The inner ventral margin is plain, sharp, and slightly beveled. The hinge-margin is wide and thick, narrowest just behind the beaks, gradually widening and thickening toward both ends. The anterior portion is much the shorter and somewhat the wider and slopes more rapidly; along the narrow middle portion the teeth are quite small, but regular, transverse, and separated by narrow intervals; owing to the absence of a chondrophore, there is no definite center, but in front of the tip of the beaks there are about eight teeth which increase rapidly in size and prominence, the four distal ones being large, elevated, and somewhat V-shaped; behind the beak there are about twenty-three teeth, of which nine or ten proximal ones are small; they then commence to increase in size and length so that eight or nine are larger and higher than the rest; these are, however, smaller and more acute than the larger ones in the anterior portion; two or three distal ones are a little less elevated than

those which precede them and a little different in form. Above the teeth there is a distinct and rather deep submarginal groove for the ligament which extends continuously both in front of, and behind the beaks. Behind the beaks there is a distinct rounded ridge running outside of, and parallel with the ligamental groove and terminating at the distal end of the row of teeth. Pallial line entire; no siphon; anal opening separated, surrounded by about twelve unequal papillæ; elsewhere the open mantle edge is nearly plain; foot large with a crenate disk.

Epidermis pale yellowish brown; interior glossy bluish white without pearly luster.

Length, 8 mm.; height, 6 mm.; thickness, about 4.5 mm.

A small specimen (3 mm. long, 2.5 mm. high) from station 2714, is doubtfully referred to this species. Externally it is covered with very fine regular, concentric, raised lines and grooves, agreeing well with the corresponding umbonal portion of the type. The epidermis is thin, pale straw color. The outline is also similar but the posterior half of the shell is relatively a little broader, owing to a slight expansion of the postero-ventral margin. The beaks appear to be relatively less prominent. The external ligament is well developed both sides of the beaks, and is slightly thickened just under them, and fills a very slight notch in the edge of the hinge margin above the teeth. The hinge-plate is relatively broad and strong, especially anteriorly. There are thirteen posterior and nine anterior teeth, the two series separated by a small edentulous space. Some of the distal teeth in the anterior series are unusually large and stout and exceed any of those in the posterior series. The pallial line is distinct and entire.

One live specimen (station 2566), N. lat. $37^{\circ} 23'$, W. long. $63^{\circ} 8'$, in 2,620 fathoms, 1885. One, very young, live specimen (station 2714), N. lat. $38^{\circ} 22'$, W. long. $70^{\circ} 17' 30''$, in 1,825 fathoms, 1886.

This species is remarkable for its thick, firm shell, regular ovate form, and very even, concentric sculpture. In form and general appearance it resembles some species of *Callista*.

TINDARIA LATA, new species.

Shell rather thick, somewhat compressed, broad-ovate, equilateral, narrowest in front of the beaks, the posterior end somewhat produced and very broad. Umbos only slightly prominent. Beaks small, rather acute, turned directly forward and closely appressed to the margin. No lunule nor escutcheon. The antero-dorsal margin is nearly straight and slopes but little, but becomes a little convex and passes insensibly into the evenly rounded curvature of the anterior end; the ventral margin is very evenly and broadly rounded but the curve recedes as it passes backward so that the highest part of the shell is distinctly behind the middle; the posterior end is very evenly and broadly rounded without any angulation; the postero-dorsal margin is consid-

erably longer than the anterior and slopes pretty regularly and gradually from the beaks to the posterior extremity. The surface is covered with very regular, rather coarse, rounded, concentric ridges separated by deep furrows of about the same breadth. The epidermis is light straw color, only slightly lustrous and scarcely iridescent. The hinge-plate is large and strong, much elongated posteriorly, the two parts forming a very obtuse, curved angle at the beaks. The anterior portion is the broader, much the shorter, and bears about nine teeth, of which the three distal ones are much the larger and occupy about one-half the length of the series, the proximal ones being very small. The posterior portion is narrower and curved throughout; it bears seventeen or eighteen teeth of which seven or eight proximal ones are very small and acute. The hinge-plate becomes quite narrow under the beaks where the two series of teeth are interrupted by a very small edentulous space, scarcely wider than the adjacent teeth. All the larger teeth are rather crowded and compressed in the direction at right angles to the line of the hinge so that they are only slightly V-shaped. Seen in a dorsal view they appear thin and not very prominent above the margin of the shell, when the tips are broken they often appear three-lobed. The ligament is well developed and occupies a distinct, sub-marginal furrow behind the beaks. The muscular scars are well marked, small and nearly round; the pallial line is interrupted at a point a short distance from the posterior muscular scar but there is no visible sinus. The interior of the shell is grayish white but not pearly; the ventral edge is slightly beveled.

Length of the largest specimen, 7 mm.; height, 5.5 mm.

Two specimens, among Foraminifera, at station 2385, N. lat. $28^{\circ} 51'$, W. long. $88^{\circ} 18'$, in 730 fathoms, 1885.

TINDARIA CUNEATA (Smith) Dall.

Malletia cuneata SMITH, E. A., Report Voy. *Challenger*, Zool. Lamellibranchiata, XIII, p. 247, pl. xx, figs. 10, 10a, 1885 (not Jeffreys).

Malletia (Tindaria) smithii DALL, Bull. Mus. Comp. Zool., XII, p. 255, 1886.

A single young valve, among Foraminifera, at station 2655, N. lat. $27^{\circ} 22'$, W. long. $78^{\circ} 7' 30''$, in 338 fathoms, 1886. Off Grenada and the West Indies, in 390 to 1,140 fathoms.—Smith and Dall.

As the species described and figured by Mr. Smith under the name of *Malletia cuneata* is a true *Tindaria*, his name does not conflict with the *Malletia cuneata* of Jeffreys which is a true *Malletia*, and therefore should remain unchanged.

Subgenus TINDARIOPSIS Verrill and Bush, 1897.

Tindariopsis VERRILL and BUSH, Amer. Journ. Sci., III, pp. 59, 63, January, 1897.

Type.—*Tindariopsis agathida* (Dall).¹

¹ *Malletia (Tindaria) agathida* Dall, Proc. U. S. Nat. Mus., XII, p. 252, pl. XIII, fig. 10, 1889.

This division was proposed for those species which have a short rostrum, defined by a radial ridge and a furrow. The type has a well-marked dorsal ligamental furrow and a small notch or "socket" under the beak for the specialized part of the ligament. It is uncertain whether it has a siphon and a pallial sinus. In case these are present, it should form a distinct genus and be placed under *Malletinae*.

ANALYTICAL TABLE OF RECENT SUBFAMILIES, GENERA, AND SUBGENERA OF LEDIDÆ AND NUCULIDÆ HERE ADOPTED.

- A. Shell not gaping, short-ovate, subtrigonal, or rounded; posterior end without a rostrum; beaks usually curved backward; no siphon tubes nor pallial sinus.

Nuculidæ d'Orbigny.

- B. Shell more or less trigonal, usually oblique; posterior end usually shorter; beaks turned backward.....*Nuculina* Verrill and Bush.

- c. Teeth numerous, transverse, V-shaped, forming two convexly arched or angulated series; a distinct median chondrophore; no lateral teeth.

Nucula Lamarek.

- cc. Teeth few, not forming long series; a long lateral tooth in each valve; no median chondrophore.....*Nuculina* d'Orbigny

- AA. Shell ovate, oblong or lanceolate; posterior end generally the longer and usually more or less rostrated; siphon tubes and pallial sinus generally present.

Ledidæ H. and A. Adams.

- C. Cartilage or resilium present, not closely united with the external ligament.

Ledinæ H. and A. Adams.

- a. Resilium supported by a definite concave chondrophore extending inward to, or beyond, the inner edge of the hinge-plate.

- b. Shell not gaping unless at the end of the rostrum.

- c. Shell distinctly rostrated and carinated posteriorly.

Leda Schumacher (sense extended).

- d. Shell elongated and tapered posteriorly, rostrum long, bicarinate, blunt; ligamental area or escutcheon long and well-defined; pallial sinus and siphon tubes developed.....*Leda* (sense restricted).

- dd. Shell shorter, swollen, ovate or oblong, posteriorly not much elongated; rostrum short, usually acute, unicarinate.

- e. Shell ovate, rostrum small, acute; ligamental area or escutcheon distinctly bordered by a carina.

- f. Rostrum short, subacute, submedian, defined below by a ventral sinuosity or emargination.....*Junonia* Seguenza = *Ledella* Verrill and Bush.

- ff. Rostrum short, dorsal, not defined below by a ventral sinuosity; postero-dorsal margin concave; escutcheon sunken.....*Jupiteria* Bellardi.

- ee. Shell oblong, angular, subtruncate, rostrum short, angular, dorsal, defined below by a marginal sinuosity; escutcheon well-defined....*Portlandia* Mörch.

- ccc. Shell not rostrated, small, ovate or elliptical, rounded at both ends, anterior end the shorter, no carina, lunule, nor escutcheon; cartilage posterior, inter-nymphal.....*Microyoldia* Verrill and Bush.

- bb. Shell oblong or lanceolate, compressed, nearly plain, more or less gaping at both ends; rostrum not well-defined; pallial sinus large and broad; tubes long, united.

- g. Teeth transverse, -shaped, numerous, in two long series; chondrophore large, concave, projecting strongly inside the hinge-plate.

Yoldia Möller (sense extended).

- h. Shell large, compressed, rounded anteriorly, broadest posteriorly with a postero-ventral protrusion and radial ridge; rostrum short, broad, poorly defined; external ligament well developed, prominent both sides of the beaks, occupying a continuous furrow; no lunule nor escutcheon.

Megayoldia Verrill and Bush.

- hh. Shell lanceolate or long-ovate, posteriorly narrowed and somewhat elongated, more or less sinuous below; rostrum slightly defined, smooth or slightly carinate; external ligament feebly developed. *Foldia* (sense restricted).
- hhh. Shell oblong, smooth, plain, blunt and rounded at both ends, without any distinct carina, sinuosity or rostrum *Orthogoldia* Verrill and Bush.
- hhhh. Shell thin, compressed, narrow-lanceolate or long-elliptical, nearly equilateral, and gaping at both ends; sculpture oblique.
- Adams H. and A. Adams.
- hhhhh. Shell hyaline, oblong-ovate, broad posteriorly, concentrically sculptured, rostrum nearly obsolete *Adranella* Verrill and Bush.
- gg. Shell thin, oblong, inequilateral, blunt at both ends, not rostrated nor carinated; teeth few, lamellar, very oblique. Type, *S. fragilis* Jeffreys.
- Silicula Jeffreys.
- aa. Shell small, nearly plain, not much rostrated nor carinated; resilium without a prominent chondrophore, situated in a notch in the hinge-margin, interrupting the series of teeth.
- l. Teeth V-shaped, numerous in both series.
- m. Shell oblong or subovate, blunt posteriorly, with a slightly sinuous margin, sometimes subrostrate, not carinate. *Yoldiella* Verrill and Bush.
- mm. Shell regularly ovate, rounded at both ends, not sinuous nor carinate, (?) no pallial sinus. *Sarepta* A. Adams.
- ll. Shell short-ovate, not sinuous nor angulated; teeth few, oblique, not regularly V-shaped. Type, *P. ovatus* Seguenza. *Phaseolus* Seguenza.
- CC. No true resilium; ligament well developed, often prominent behind the beaks which are usually turned forward.
- D. Siphon tubes and pallial sinus present; teeth mostly V-shaped, in two long series, often interrupted by a median edentulous space.
- Malletinae H. and A. Adams.
- o. Siphon tubes long; pallial sinus large; shell elongated, gaping.
- p. Shell oblong or elliptical, blunt posteriorly, not distinctly rostrate; series of teeth unequal; those in the anterior series fewer. *Malletia* Desmoulins.
- pp. Shell long-ovate or oblong, broadly angulated and sinuous posteriorly; distinctly rostrate and carinate; two series of teeth nearly equal.
- Neilo H. and A. Adams.
- oo. Siphon and pallial sinus small, shell ovate, not gaping; a rudimentary marginal resilium *Neilonella* Dall.
- DD. Shell short-ovate or subcordate, closed at both ends, umbos prominent; ligament entirely external; series of teeth generally continuous.
- Tindarinae Verrill and Bush.
- s. Shell regularly ovate, grooved, without rostrum or carina; beaks turned forward; no pallial sinus. *Tindaria* Bellardi.
- ss. Shell ovate, with a distinct posterior sinuosity and a short rostrum.
- Tindariopsis Verrill and Bush.

Family SOLENOMYIDÆ.

SOLEMYA GRANDIS, new species.

(Plate LXXXVI, figs. 1, 2.)

Shell large, considerably broader anteriorly than posteriorly, dorsal margin in front of the beaks straight and thickened by an internal ridge and a strong epidermal fold. At the anterior end the valves gape widely, and the edge of each is divided into six or seven long, nearly regular, digitate processes of nearly uniform width, and obtusely rounded at the ends, separated by notches, rounded proximally. The

general outline of this end is broadly truncate; the ventral margin is somewhat convex but slopes upward toward the posterior end and is nearly straight along the middle; the posterior end is short, evenly rounded, with the dorsal margin, behind the beaks, strongly incurved; the large black ligament which occupies this area is continuous with the epidermis, so that its outline forms a curve nearly in line with that of the anterior end, and shows but a slight angle, or lobe, at the outer end of the dorsal line. The umbos are flattened, and scarcely prominent. The whole surface is covered with a thick, smooth, glossy epidermis, chestnut-brown in the young and brownish black in adult, which anteriorly is divided into several rather broad digitations that are shorter and somewhat wider ventrally, their length diminishing from the middle of the anterior end to the ventral margin, along the middle of which there are no digitations, but short and broad ones again appear posteriorly. The shell is sculptured by radiating ribs and furrows which are but slightly developed on the middle region but become large and strong anteriorly and smaller and closer posteriorly. On the anterior part these ribs are broad and flat, separated by wide, flat-bottomed, furrows often nearly as wide as the ribs; on the middle area, the furrows are shallow and rounded while the intervening spaces are flat, sometimes broad, at others narrow, this region appearing comparatively smooth, some specimens showing but slight indications of grooves and ribs; posteriorly these are somewhat more numerous, narrower, often about equal in width. In specimens of medium size, there are from six to eight of the large anterior furrows and as many ribs; the edges of the latter are somewhat elevated above the middle portion and these thickened margins extend out along the edges of the digitations which otherwise correspond to the furrows. Internally the shell is white, moderately thick, the anterior portion oblong with obtusely truncated end, the dorsal and ventral margins nearly parallel, and the posterior much narrower and tapered to an obtusely rounded end, with the dorsal margin excavated for the ligamental area. The surface shows distinct but not very prominent grooves and ridges corresponding to the exterior ones; at the anterior end the margin shows slight lobes, corresponding to the intervals between the epidermal digitations. The anterior muscular scar is large and rounded, the posterior one is smaller and subovate. Anteriorly the hinge-margin is thickened in both valves, running from near the beak nearly to the end; posteriorly it is more strongly thickened by a sinuous callus to which the ligament is attached, while under and just in front of the beak the margin is excavated for the reception of the cartilage which continues forward in a groove and is continuous with the broad, dorsal, epidermal margin which unites the two valves throughout their length. The posterior ligament and anterior cartilage appear to blend just beneath the beaks; the commencement of the cartilage is, however, indicated by a slight notch in the callus-margin, in both valves, and the ligament appears

to extend forward in a point between the two sides of the cartilage. There are no transverse costæ or buttresses for strengthening the hinge-margin.

Entire length, including epidermal lobes, 54 mm.; entire height, opposite the beaks, 22 mm.; height of the anterior third, 26 mm.; breadth, in the middle, 12 mm.; length of longest digitations, about 10 or 12 mm.; length of the shell itself, 42 mm.; height at the middle, 15 mm.; length from beak to anterior end, 30 mm.; to posterior end, 14 mm. Fragments of specimens more than twice as large as the one measured have been taken. In one of these the height of the shell without the epidermis is 25 mm.

Two good specimens and some fragments, at four stations, between N. lat. $39^{\circ} 58' 30''$, W. long. $70^{\circ} 30'$, and N. lat. $37^{\circ} 24'$, W. long. $74^{\circ} 17'$, in 300 to 1,600 fathoms, 1880-1884.